DEFRA

THE SCIENTIFIC CASE FOR SETTING A LONG-TERM EMISSION REDUCTION TARGET

February 2003 - Sarah Hendry and David Warrilow at DEFRA were forced by GCI after an appeal to the Minister to include the source referencing of C&C to GCI.

Methodology - The framework of this study builds on the RCEP work which uses a **convergence and contraction** methodology.

Contraction and convergence is an international policy framework for dealing with global climate change developed by the London-based Global Commons Institute.

Whilst prescribed per capita emissions are retained, the flexibility is such that these are only a tool to constrain total emissions and this should not be considered a typical contraction and convergence (C&C)1 approach (although any mechanism which brings all emissions to a level lower than today's will have an element of C&C). The RCEP restricted itself to UK emissions whereas this study addresses global emissions but only subdivides into Annex 1 parties (A1) and non-Annex 1 parties (NA1) and so cuts are assumed to be equal across each group. This study also differs from RCEP in that it takes into account emissions out to 2300. There are considerable cumulative emissions post 2100 in the WRE stabilisation profiles and this study allows the redistribution of these far future emissions into this century. As with RCEP, population is held constant after 2050 although the results are not found to be sensitive to population numbers. The methodology is best illustrated by presenting the steps taken:

1. Assume the level of cumulative carbon emissions allowed to reach chosen stabilisation level. To the first order, stabilisation is determined by the cumulative emissions. Depending on the level of carbon uptake by the natural system this is between 1150 and 1750 GtC for stabilising at 550 ppm. No other stabilisation level has been considered in this study.
2. Assume an economic and population projection. Here, SRES B2 is used as the lower bound and SRES A1FI as the upper bound.
3. Set A1 emissions reductions to start at 2000, at 2050 to be 60% of that at 1990
4. and by 2150 at a level consistent with world emissions of 2 GtC if high carbon uptake is assumed and 1 GtC if low uptake. One of the primary objectives of this study is to explore the consequences of the RCEP recommendations.
5. Set dates for NA1 start of emission controls, first emission target and second target. A range of start dates is explored with the first target constant at 2100 and the second constant at 2150.
6. Once a start date for NA1 emission control is chosen the emission level for the 1st target is adjusted until the cumulative emissions equal the chosen level in step 1. The second target is chosen to be, like for A1, consistent with world emissions of 2 GtC if high carbon uptake is assumed and 1 GtC for low uptake.

Contraction and convergence is an international policy framework for dealing with global climate change developed by the London-based Global Commons Institute.